

## **CHAPTER 6**

### **FUTURE DIRECTIONS IN THE HIWASSEE RIVER WATERSHED**

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#### **6.1. BACKGROUND.**

The Watershed Water Quality Management Plan serves as a comprehensive inventory of resources and stressors in the watershed, a recommendation for control measures, and a guide for planning activities in the next five-year watershed cycle and beyond. Water quality improvement will be a result of implementing both regulatory and nonregulatory programs.

In addition to the NPDES program, some state and federal regulations, such as the TMDL and ARAP programs, address point and nonpoint issues. Construction and MS4 stormwater rules (implemented under the NPDES program) are transitioning from Phase 1 to Phase 2. More information on stormwater rules may be found at: <http://www.state.tn.us/environment/wpc/stormh2o/MS4.htm>.

This Chapter addresses point and nonpoint source approaches to water quality problems in the Hiwassee River Watershed.

**6.2. COMMENTS FROM PUBLIC MEETINGS.** Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permittees, business people, farmers, and local river conservation interests. Locations for meetings were frequently chosen after consulting with people who live and work in the watershed. Everyone with an interest in clean water is encouraged to be a part of the public meeting process. The times and locations of watershed meetings are posted at: <http://www.state.tn.us/environment/wpc/public.htm>.

**6.2.A. Year 1 Public Meeting.** The first Hiwassee River Watershed public meeting was held April 10, 1997 in Cleveland. The goals of the meeting were to 1)present, and review the objectives of, the Watershed Approach, 2)introduce local, state, and federal agency and nongovernment organization partners, 3)review water quality monitoring strategies, and 4)solicit input from the public.

#### Major Concerns/Comments

- ◆ Effects of polluted waters flowing into Tennessee from out of state
- ◆ Need to increase public participation at meetings
- ◆ Need more river access for recreation
- ◆ Trash (litter)
- ◆ Erosion and the resulting sediment getting into rivers
- ◆ Effect of 319 Program's move to Department of Agriculture
- ◆ Water withdrawals

**6.2.B. Year 3 Public Meeting.** The second Hiwassee River Watershed public meeting was held August 10, 1999 in Athens (Tennessee Wesleyan College). The goals of the meeting were to 1)provide an overview of the watershed approach, 2)review the monitoring strategy, 3)summarize the most recent water quality assessment, 4)discuss the TMDL schedule and citizens' role in commenting on draft TMDLs, and 5)discuss BMPs and other nonpoint source tools available through the Tennessee Department of Agriculture 319 Program and NRCS conservation assistance programs.

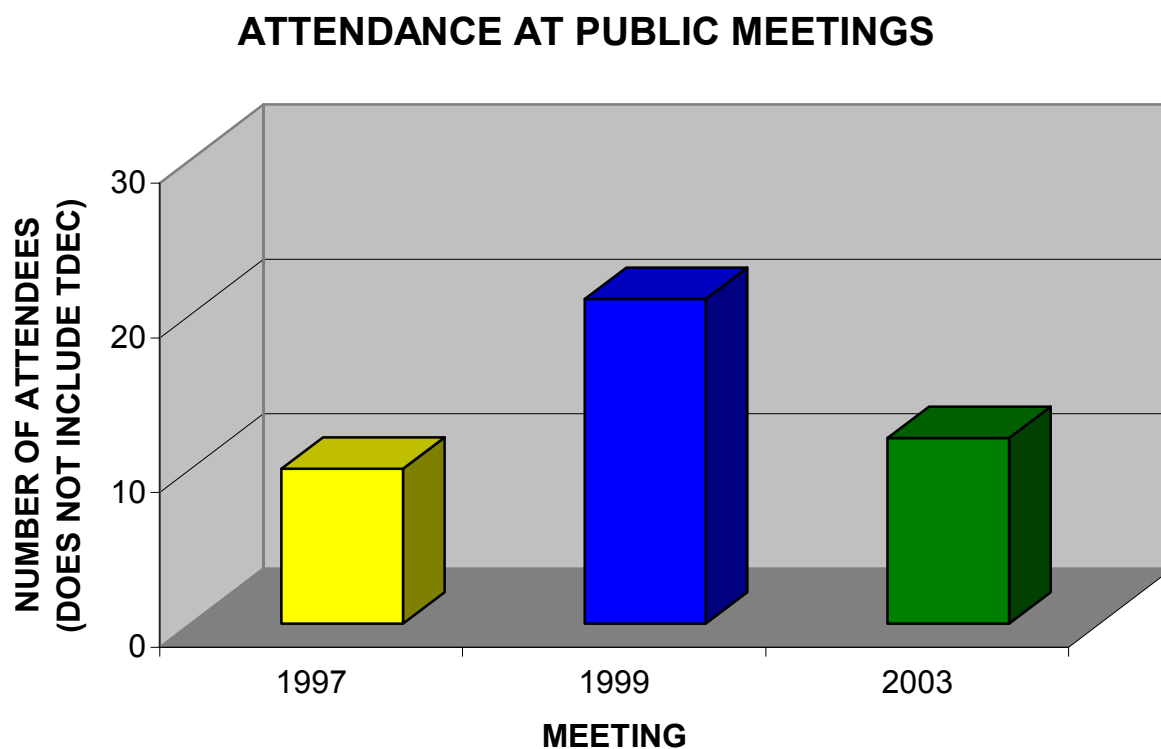
#### Major Concerns/Comments

- ◆ Nonpoint sources of pollution have to be addressed if the TMDL is to be thorough
- ◆ Municipalities will be asked to shoulder the burden of the cost of clean water while agriculture does not
- ◆ Fairness to taxpayers of paying for water quality improvements when most problems are due to agriculture

**6.2.C. Year 3 Public Meeting.** The third scheduled Hiwassee River Watershed public meeting was held November 6, 2003 at Tennessee Wesleyan University in Athens. The meeting featured six educational components:

- Overview of draft Watershed Water Quality Management Plan slide show
- Benthic macroinvertebrate samples and interpretation
- SmartBoard™ with interactive GIS maps
- “How We Monitor Streams” self-guided slide show
- “Why We Do Biological Sampling” self-guided slide show
- UT-Extension Service Display
- Tennessee Valley Authority Display

In addition, citizens had the opportunity to make formal comments on the draft Watershed Water Quality Management Plan and to rate the effectiveness of the meeting.



*Figure 6-1. Attendance at Public Meetings in the Hiwassee River Watershed.*



*Figure 6-2. Watershed meetings with an educational slide program about the watershed and a review of the draft Watershed Water Quality Management Plan.*



*Figure 6-3. The SmartBoard™ is an effective interactive tool to teach citizens about the power of GIS.*



**Figure 6-4. Microscopes and hand lenses help Environmental Specialist Steve Winesett teach participants about the relationship between aquatic insects and water quality.**



### 6.3. APPROACHES USED.

**6.3.A.** Point Sources. Point source contributions to stream impairment are primarily addressed by NPDES and ARAP permit requirements and compliance with the terms of the permits. Notices of NPDES and ARAP draft permits available for public comment can be viewed at <http://www.state.tn.us/environment/wpc/wpcppo/>. Discharge monitoring data submitted by NPDES-permitted facilities may be viewed at [http://www.epa.gov/enviro/html/pcs/pcs\\_query\\_java.html](http://www.epa.gov/enviro/html/pcs/pcs_query_java.html).

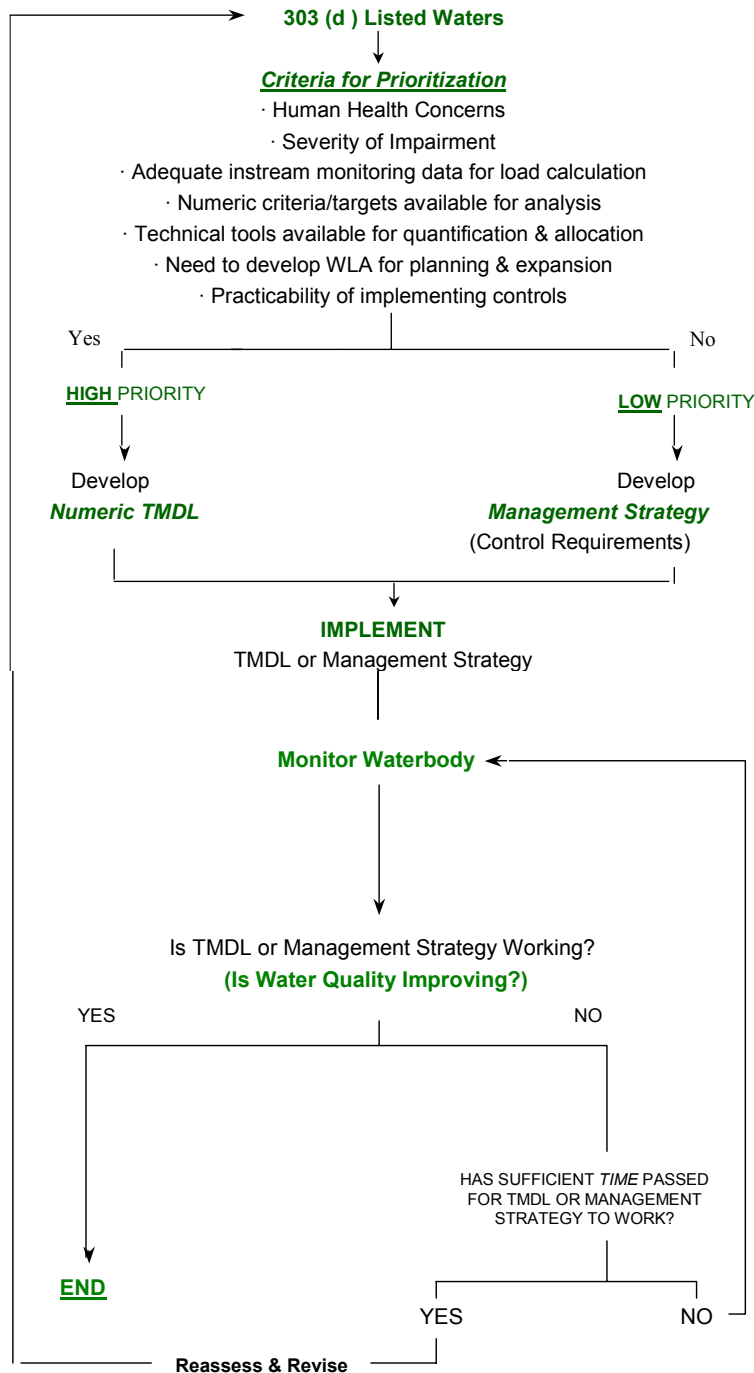
The purpose of the TMDL program is to identify remaining sources of pollution and allocate pollution control needs in places where water quality goals are still not being achieved. TMDL studies are tools that allow for a better understanding of load reductions necessary for impaired streams to return to compliance with water quality standards. More information about Tennessee's TMDL program may be found at: <http://www.state.tn.us/environment/wpc/tmdl.php>

Approved TMDL:

**Oostanaula Creek TMDL.** TMDL for fecal coliform in the Hiwassee River Watershed approved September 20, 2002:  
<http://www.state.tn.us/environment/wpc/OostF2.pdf>

**Cane Creek TMDL.** Total Maximum Daily Load for fecal coliform in Cane Creek, Hiwassee River Watershed, McMinn County, Tennessee:  
<http://www.state.tn.us/environment/wpc/tmdl/approvedtmdl/CaneF3.pdf>

TMDLs are prioritized for development based on many factors.



**Figure 6.5. Prioritization scheme for TMDL Development.**



### **6.3.B. Nonpoint Sources**

Common nonpoint sources of pollution include urban runoff, riparian vegetation removal, and inappropriate land development, agricultural, and road construction practices. Since nonpoint pollution exists essentially everywhere rain falls and drains to a stream, existing point source regulations can have only a limited effect, so other measures are necessary.

There are several state and federal regulations that address some of the contaminants impacting waters in the Hiwassee River watershed. Most of these are limited to only point sources: a pipe or ditch. Often, controls of point sources are not sufficient to protect waters, so other measures are necessary. Some measures include voluntary efforts by landowners and volunteer groups, while others may involve new regulations. Many agencies, including the Tennessee Department of Agriculture and NRCS, offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be sufficient for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education.

The following text describes certain types of impairments, causes, suggested improvement measures, and control strategies. The suggested measures and streams are only examples and efforts should not be limited to only those streams and measures mentioned.

#### **6.3.B.i. Sedimentation.**

**6.3.B.i.a. From Construction Sites.** Construction activities have historically been considered “nonpoint sources.” In the late 1980’s, EPA designated them as being subject to NPDES regulation if more than 5 acres are disturbed. In the spring of 2003, that threshold became 1 acre. The general permit issued for such construction sites sets out conditions for maintenance of the sites to minimize pollution from stormwater runoff, including requirements for installation and inspection of erosion controls. Also, the general permit imposes more stringent inspection and self-monitoring requirements on sites in the watershed of streams that are already impaired due to sedimentation. Examples in the Hiwassee River Watershed are Conasauga Creek and Candies Creek. Regardless of the size, no construction site is allowed to cause a condition of pollution.

Construction sites within a sediment-impaired watershed may also have higher priority for inspections by WPC personnel, and are likely to have enforcement actions for failure to control erosion.

The same requirements apply to sites in the drainage of high quality waters. Blackburn Creek and Gee Creek are examples of high quality streams in the Hiwassee River Watershed.

**6.3.B.i.b.** From Channel and/or Bank Erosion. Due to the past channelization of Oostanaula Creek, Candies Creek, and other Hiwassee River tributaries, the channels are unstable. Several agencies are working to stabilize portions of stream banks. These include NRCS and the Tennessee Valley Authority, as well as citizen groups. Other methods or controls that might be necessary to address common problems are:

*Voluntary activities*

- Re-establishment of bank vegetation (example: tributaries of Candies Creek).
- Establish off-channel watering areas for cattle by moving watering troughs and feeders back from stream banks (examples: Chatata Creek and Agency Creek).
- Limit cattle access to streams and bank vegetation (example: Hawkins Branch).

*Additional strategies*

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices.
- Better community planning for the impacts of development on small streams, especially development in growing areas (examples: South Mouse Creek, Oostanaula Creek, and Cane Creek).
- Limit livestock access to streams and bank vegetation (example: Hawkins Branch and tributaries of Candies Creek).
- Restrictions requiring post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion (examples: South Mouse Creek and Oostanaula Creek).
- Additional restrictions on logging in streamside management zones.
- Prohibition on clearing of stream and ditch banks (example: Conasauga Creek).  
*Note: Permits may be required for any work along streams.*
- Additional restriction to road and utilities crossings of streams.
- Restrictions on the use of off-highway vehicles on stream banks and in stream channels.

**6.3.B.i.c.** From Agriculture and Silviculture. Even though there is an exemption in the Water Quality Control Act which states that normal agricultural and silvicultural practices which do not result in a point source discharge do not have to obtain a permit, efforts are being made to address impacts due to these practices.

The Master Logger Program has been in place for several years to train loggers how to plan their logging activities and to install Best management Practices that lessen the impact of logging activities. Recently, laws and regulations were enacted which established the expected BMPs to be used and allows the Commissioners of the Departments of Environment and Conservation and of Agriculture to stop a logging operation that has failed to install these BMPs and so are impacting streams.

Since the Dust Bowl era, the agriculture community has strived to protect the soil from wind and soil erosion. Agencies such as the Natural resources Conservation Service (NRCS), the University of Tennessee Agricultural Extension Service, and the Tennessee department of Agriculture have worked to identify better ways of farming, to educate the farmers, and to install the methods that address the sources of some of the impacts due to agriculture. Cost sharing is available for many of these measures. Oostanaula Creek

would benefit from the installation of several BMPs to address the sediment lost from fields in this watershed.

#### **6.3.B.ii. Pathogen Contamination.**

Possible sources of pathogens are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter in streams and storm drains due to pets, livestock and wildlife. Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. Septic tank and field lines are regulated by the Division of Ground Water Protection within the Chattanooga Environmental Assistance Center and by delegated county health departments. In addition to discharges to surface waters, businesses may employ either subsurface or surface disposal of wastewater. The Division of Water Pollution Control regulates surface disposal.

Other measures that may be necessary to control pathogens are:

##### *Voluntary activities*

- Off-channel watering of livestock (examples: tributaries of Candies Creek, Hawkins Branch, and Dairy Creek).
- Limiting livestock access to streams (examples: Chatata Creek and Hawkins Branch).
- Proper management of animal waste from feeding operations.

##### *Enforcement strategies*

- Greater enforcement of regulations governing on-site wastewater treatment.
- Timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identification of Concentrated Animal Feeding Operations not currently permitted, and enforcement of current regulations.

##### *Additional strategies*

- Restrict development in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables.
- Develop and enforce leash laws and controls on pet fecal material (example: South Mouse Creek).
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes, (example: Chestuee Creek).

#### **6.3.B.iii. Excessive Nutrients and/or Dissolved Oxygen Depletion.**

These two impacts are usually listed together because high nutrients often contribute to low dissolved oxygen within a stream. Since nutrients often have the same source as pathogens, the measures previously listed can also address many of these problems.

Elevated nutrient loadings are also often associated with urban runoff from impervious surfaces and from fertilized lawns and croplands.

Other sources of nutrients can be addressed by:

*Voluntary activities*

- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones (examples of streams that could benefit are Candies Creek, tributaries of Conasauga Creek, and areas along stream channels). Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures.
- Use grassed drainage ways that can remove fertilizer before it enters streams.
- Use native plants for landscaping since they don't require as much fertilizer and water.

Physical changes to streams can prevent them from providing enough oxygen to biodegrade the materials that are naturally present. A few additional actions can address this problem:

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. As a general rule, all stream channels suffer from some canopy removal.
- Discourage impoundments. Ponds and lakes do not aerate water. *Note: Permits may be required for any work on a stream, including impoundments.*

**6.3.B.iv. Toxins and Other Materials.**

Many materials enter our streams due to apathy, or lack of civility or knowledge by the public. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all examples of pollution in streams. Some can be addressed by:

*Voluntary activities*

- Providing public education.
- Painting warnings on storm drains that connect to a stream (This would benefit South Mouse Creek, Cane Creek, and Oostanaula Creek).
- Sponsoring community clean-up days (This would benefit South Mouse Creek).
- Landscaping of public areas.
- Encouraging public surveillance of their streams and reporting of dumping activities to their local authorities.

*Needing regulation*

- Prohibition of illicit discharges to storm drains.
- Litter laws and strong enforcement at the local level.

### **6.3.B.v. Habitat Alteration.**

The alteration of the habitat within a stream can have severe consequences. Whether it is the removal of the vegetation providing a root system network for holding soil particles together, the release of sediment, which increases the bed load and covers benthic life and fish eggs, the removal of gravel bars, “cleaning out” creeks with heavy equipment, or the impounding of the water in ponds and lakes, many alterations impair the use of the stream for designated uses. Habitat alteration also includes the draining or filling of wetlands.

Measures that can help address this problem are:

#### *Voluntary activities*

- Sponsoring litter pickup days to remove litter that might enter streams (examples: Oostanaula Creek and South Mouse Creeks).
- Organizing stream cleanups removing trash, limbs and debris before they cause blockage.
- Avoiding use of heavy equipment to “clean out” streams.
- Planting vegetation along streams to stabilize banks and provide habitat (example: tributaries of Candies Creek).
- Encouraging developers to avoid extensive culverts in streams.

#### *Current regulations*

- Restrict modification of streams by such means as culverting, lining, or impounding.
- Require mitigation for impacts to streams and wetlands when modifications are allowed.

#### *Additional Enforcement*

- Increased enforcement may be needed when violations of current regulations occur.